

Medical University of South Carolina

MEDICA

MUSC Theses and Dissertations

2016

Financial Viability of Implementing Home-Based Primary Care Programs in Federally-Qualified Health Centers in the United States: An Empirical Assessment

Stephen J. Roller

Medical University of South Carolina

Follow this and additional works at: <https://medica-musc.researchcommons.org/theses>

Recommended Citation

Roller, Stephen J., "Financial Viability of Implementing Home-Based Primary Care Programs in Federally-Qualified Health Centers in the United States: An Empirical Assessment" (2016). *MUSC Theses and Dissertations*. 413.

<https://medica-musc.researchcommons.org/theses/413>

This Dissertation is brought to you for free and open access by MEDICA. It has been accepted for inclusion in MUSC Theses and Dissertations by an authorized administrator of MEDICA. For more information, please contact medica@musc.edu.

FINANCIAL VIABILITY OF IMPLEMENTING HOME-BASED PRIMARY CARE
PROGRAMS IN FEDERALLY-QUALIFIED HEALTH CENTERS IN THE UNITED
STATES: AN EMPIRICAL ASSESSMENT

BY

Stephen Joseph Roller

A doctoral project submitted to the faculty of the Medical University of South Carolina in
partial fulfillment of the requirements for the Doctor of Health Administration in the
College of Health Professions




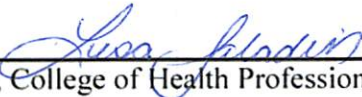
©Stephen Roller 2016 All rights reserved

FINANCIAL VIABILITY OF IMPLEMENTING HOME-BASED PRIMARY CARE
PROGRAMS IN FEDERALLY-QUALIFIED HEALTH CENTERS IN THE UNITED
STATES: AN EMPIRICAL ASSESSMENT

BY

Stephen Joseph Roller

Approved by:

			
Chair, Project Committee	Member, Project Committee	Member, Project Committee	Dean, College of Health Professions
Walter J. Jones, Ph.D.	Kit N. Simpson, Dr.P.H.	J. Michael Benfield, M.D.	Lisa K. Saladin, Ph.D.
4/19/16	4/20/16	4-12-16	5-4-16
Date	Date	Date	Date

Acknowledgements

I would like to thank my amazing wife, Lydia, for her constant support throughout this process. You are my best friend, my soulmate, and there is no one I would rather share these memories with than you. The love and encouragement that you selflessly provide is an amazing example to our kids and a constant reminder that I am an amazingly blessed man! I look forward to more time together now and can't wait to see what amazing things God has in store for us! I would also like to thank my beautiful children Addison, Averi, Elijah and Aubriella for being flexible and making many trips to Charleston for Daddy's school. I love you so much and you will always be my greatest accomplishments, my proudest moments, and my greatest sources of joy in this world! What a great encouragement and source of motivation through this process you have been! I hope that you will all remember this three year journey as a great experience that allowed us make some incredible memories and grow closer as a family. I also hope that you take this experience and use it as an example to encourage you and challenge you to dream big and pray hard. As long as you do these things, there is no limit to the impact you will have on this world.

While there are too many other family members to call out individually, I would like to mention that my grandparents' support and prayers have always encouraged me to push harder and reach higher. Dad, you are the most humble man I know and also the hardest worker. I thank you and love you for modeling what unconditional love looks like. I can't finish thanking family without honoring my mother. Mom, growing up there was never a more proud mother or a bigger advocate for her children than you. The encouragement you tirelessly provided and the example of how to approach a challenge

with intensity and perseverance were crucial in getting here. I know you are proud today and I couldn't be more proud of your legacy in me.

Additionally, I want to thank Dr. Walter Jones for his guidance and support through the dissertation process. Your direction and motivation helped me to finish strong! I also would like to thank Dr. Kit Simpson for her ability to take complex problems and make them seem so manageable. Such a gifted educator and your passion for your craft and your students exudes from you. I would also like to thank Dr. Mike Benfield for your expertise and support to help me make it to this point. Your innovative mind and willingness to remove barriers for patients is a great example to me and the greater healthcare profession. Thank you for taking a chance on me and supporting me in achieving this milestone. I would also like to acknowledge the faculty and staff at The Medical University of South Carolina for their continued desire to see a new generation of healthcare leaders rise up and tackle the challenges we are facing in healthcare in America.

For the countless other people that have had an impact on my life, know that your role in helping me get to this spot is priceless and I am forever grateful.

Table of Contents

	<u>Page</u>
Acknowledgements.....	ii
Table of Contents.....	iv
List of Figures.....	v
List of Tables.....	vi
Abstract.....	vii
I. INTRODUCTION.....	8
Background and Need.....	
Problem Statement.....	
Research Hypotheses.....	
II. REVIEW OF THE LITERATURE.....	14
III. METHODOLOGY.....	43
Study Design and Hypotheses.....	
Population and Sample.....	
Definition of Variables.....	
Data Collection.....	
Data Analysis.....	
Limitations.....	
ARTICLE MANUSCRIPT.....	52
REFERENCES.....	65
APPENDIX.....	75

List of Figures

Figure 1. Inclusion and exclusion criteria for study evaluation	45
---	----

List of Tables

Table 1. Financial viability projections.....	50
Table 2. Additional patient and encounter projections.....	50

Abstract of Doctoral Project Report Presented to the
Interprofessional Doctoral Program in Health Administration & Leadership
Medical University of South Carolina
In Partial Fulfillment of the Requirements for the
Degree of Doctor of Health Administration

FINANCIAL VIABILITY OF IMPLEMENTING HOME-BASED PRIMARY CARE
PROGRAMS IN FEDERALLY-QUALIFIED HEALTH CENTERS IN THE U.S.: AN
EMPIRICAL ASSESSMENT

BY
Stephen Joseph Roller

Chairperson: Dr. Walter Jones, PhD
Committee: Dr. Kit Simpson, DrPH
Dr. J. Michael Benfield, MD

Home-based primary care (HBPC) has been shown to be an effective method of delivering primary care services to high-risk, high-utilizing patients. Federally-Qualified health centers (FQHCs) have historically provided, and continue to provide, comprehensive primary care for a majority of the medically underserved patients across the United States. Often times, the patients that access primary care from FQHCs may experience socioeconomic, behavioral, or physical factors that would make an elderly or home-bound patient eligible for a HBPC program. With increased focus on population health management and a much anticipated transition from fee-for-service to value-based payments, the implementation of this delivery model would seem to be an innovative method of removing barriers for medically underserved populations. The purpose of this research is to analyze the financial viability of implementing this model of primary care delivery in FQHC settings to help improve access to care and improve outcomes in a cost-effective manner.

Keywords: Home-based primary care, Federally-Qualified Health Centers

CHAPTER 1: INTRODUCTION

Background and Need

While home-based primary care (HBPC) is not a new concept in the healthcare profession, it is one that has previously been used in only very focused and limited applications. This model of healthcare delivery involves physicians, physician's assistants (PAs), and / or nurse practitioners (NPs) seeing a patient in their place of residence, be that a house, apartment, condo, trailer, or assisted living complex. The rationale behind this model of healthcare delivery is that if a patient is physically unable to access traditional office-based primary care (OBPC), they will more frequently utilize care in higher-cost settings such as the emergency department (ED), resulting in more fragmented care, increased hospitalizations, and poorer quality outcomes for patients (Kao, Conant, Soriano, & McCormick, 2009). This is exactly the opposite of the goal of the Triple Aim, which seeks to improve access to care, improve patient outcomes, and decrease overall cost of care across the healthcare system (Hawkins & Groves, 2011). The Veteran's Administration (VA) has historically used this model of healthcare delivery for a segment of their elderly veterans who have multiple chronic diseases and have difficulty getting to a traditional OBPC practice (Edes et al., 2014). Medicare has allowed for HBPC providers to see patients who are considered homebound and physically unable to safely access primary care without these specialized services, but the number of providers are limited and the age and the amount of chronic disease burden that these patients possess is not reflective of the entire populace (DeCherrie, Soriano, & Hayashi, 2012).

There is literature currently available that evaluates the clinical efficacy and cost-effectiveness of HBPC in elderly and VA patient populations, but there is no current literature to look at the provision of HBPC by Federally-Qualified Health Centers (FQHCs) as a method of delivering primary care to patients. FQHCs serve a disproportionate amount of medically underserved patients, often with significant chronic disease burden, many confounding social determinants of health, and either no health insurance, Medicaid, or managed-Medicaid as their primary payer source (Proser, 2005). With patients ranging in age from infants to elderly, these FQHCs become a central hub in communities where resources are limited and healthcare is often accessed through much costlier care providers. Many of the very same limitations that have been justification for enrollment in HBPC services for elderly and VA patients, such as inability to obtain transportation, or risk of injury with OBPC visits, are present in FQHC patients, often related to socioeconomic factors that are present not just in elderly patients, but young families as well. In order to get these families the access to patient-centered primary care that they need, we must evaluate if HBPC is an effective model in removing barriers to care and whether it can be cost-effective in this population which differs from traditional HBPC patients.

With the passage of the Patient Protection and Affordable Care Act (PPACA), there has been an increase in the number of patients that have access to a payer source for their healthcare needs, but the largest area for this growth has been in the expansion of Medicaid (Rice, 2015). These patients may have coverage, but without a quality primary care provider (PCP) that accepts their new coverage, the patients remain medically underserved and prone to poor utilization of services for preventative screenings and

chronic disease management. In many communities, the local FQHC is the largest provider of comprehensive primary care services to uninsured or Medicaid patients and has consistently led the charge in bringing innovative approaches to delivering care and improving patient outcomes in a cost-effective manner (Hawkins & Groves, 2011). We see this in areas such as telemedicine, mobile medical and dental clinics, and the concept of patient-centered medical homes (PCMHs). There is significant bipartisan support for the FQHC program because it has shown to be a fiscally responsible investment of taxpayer funds and the return-on-investment is exceptional. With that in mind, there are always opportunities for further innovation and improvements in our approach to delivering primary care for this patient population. By implementing HBPC in a FQHC setting, we believe that this model will help to significantly remove barriers to primary care for patients.

Historically, Medicare and other payers have paid HBPC providers at a rate that is substantially higher than their OBPC colleagues, but the expectation is there is significantly more assessment and interaction that is required with these patients (Kao et al., 2009). FQHCs receive payment in a prospective payment system (PPS) that pays an encounter rate for a face-to-face encounter with an FQHC provider. This is different from a traditional private practice, where providers are paid in a fee-for-service model that is specific to the procedure or acuity level of the patient (Proser, 2005). Traditionally, the rate that FQHCs receive in the PPS system is significantly more than a fee-for-service Medicaid provider, but similar in amount to what Medicare pays for HBPC visits.

The purpose of this research is to determine if it is financially viable to proceed with wide-scale implementation of HBPC programs in FQHCs across the United States.

With increased scrutiny being focused on quality metrics and reimbursement for value-based care instead of volume-based care, the case must be made as to whether HBPC can be an economically-sustainable tool for delivery of primary care and population health management to medically underserved patient populations. We believe that this project is necessary to establish a body of work that looks at the potential impact that implementing HBPC in a FQHC setting could have on the financial position of the FQHC. If we can show this model of healthcare delivery to be cost-effective, we believe that we will see greater adoption of this model as a way to deliver primary care to medically underserved populations. As the healthcare system begins moving from a volume-based payment system to one that is value-based, having this type of program to strategically manage a patient population will be critical. Additionally, healthcare providers will need to be able to effectively collect, interpret, and manage data that is reported in items such as the Uniform Data Set (UDS), Meaningful Use (MU), and Healthcare Effectiveness Data and Information Set (HEDIS). Also, FQHCs and other healthcare systems will need to be able to develop care plans that incorporate innovative programs such as HBPC to create the opportunity for a competitive advantage for these organizations.

While there is a base of evidence that outlines the potential benefits of HBPC, both financially and clinically for certain patient populations (Colandrea & Murphy-Gustavson, 2012), there are still gaps in the research relating to other at-risk patient populations. FQHC patient populations tend to have a significant percentage of Medicaid or managed Medicaid patients, and the possibility of using HBPC as a tool to provide necessary services and to operationalize aspects of a FQHC's population health management program could significantly improve access and quality outcomes for

patients. The need for this study comes from the fact that it must be financially sustainable to model a program such as this to meet patients where they are and to remove as many barriers as possible. If we can show that this model is a viable method for meeting underserved populations, it may provide the basis for future research in the areas of population health management in FQHCs.

Problem Statement

As previously stated, the purpose of this research is to determine if it is financially viable to proceed with wide-scale implementation of HBPC programs in FQHCs across the United States. With increased scrutiny being focused on quality metrics and reimbursement for value-based care instead of volume-based care, the case must be made as to whether HBPC can be an economically-sustainable tool for delivery of primary care and population health management to medically underserved patient populations. The following research hypothesis can be studied.

Statement of Null Hypothesis

- H₀₁: The prospect of implementing HBPC programs in FQHCs across the United States will not be financially viable.
- H₀₂: The prospect of implementing HBPC programs in FQHCs across the United States will not show any promise of improving clinical measures such as asthma control, diabetes control, childhood immunization rates, and the rate for adolescent weight screening.

Hypotheses

- H₁: Variations in FQHC rates of asthma control, adolescent weight screening, diabetes control, and childhood immunizations may be expected to affect the financial viability of implementation of HBPC programs in FQHCs across the United States.
- H₂: Current public FQHC reports can be used to predict the financial viability of implementing HBPC in specific locations.
- H₃: Financial viability will differ within each FQHC for HBPCs aimed at asthma control, adolescent weight screening, diabetes control, and childhood immunization.

Population

HBPC has historically been reserved for patients that have multiple chronic diseases and are either a part of the VA system or Medicare. For the purpose of this study, we will review the cost-per-patient and potential improvements in quality data from the Health Resource and Services Administration (HRSA) Data Warehouse for FQHCs across Ohio to determine if this type of a program is viable to deliver patient-centered care and meet the financial needs of the organization.

CHAPTER II: LITERATURE REVIEW

A literature review was conducted to review current trends in HBPC, obtain a history of current HBPC programs, and get a better idea of the impact of FQHCs on the larger health system. To get a better idea of the patient populations that routinely receive care from FQHCs and / or HBPC programs, the epidemiology of vulnerable populations was included in this literature review. Nonmedical factors of care were analyzed. The means by which HBPC helps to remove barriers was also included in this review. Studies that included special populations that have historically benefited from HBPC, such as veterans, pediatric and asthmatic patients, elderly and congestive heart failure (CHF) patients, were also reviewed. Additionally, team-based care in HBPC and the use of HBPC in palliative care clinical situations were also included. Articles looking at the technological implications in HBPC as well as the financial implications of HBPC were also included. Lastly, articles looking at the efficacy and financial sustainability of school-based health centers (SBHCs) as vehicles for delivering patient-centered, comprehensive, primary care were also included. This review was comprehensive and also included review of data that was not specific to FQHCs that currently provide HBPC.

Method

The literature review began with a search of the PubMed database. Key search terms included, but were not limited to, home-based primary care, Federally-Qualified Health Centers, business case, school-based health centers, population health management, primary care delivery models, pediatric populations, elderly patient populations, telemedicine, palliative care, congestive heart failure, veterans, and asthma.

Abstracts of citations that were found in this search were reviewed and if the electronic full-text version of the article was available, then it was downloaded. While reviewing these articles, additional relevant articles were identified and included in this literature review. Articles that were not available electronically were obtained with the assistance of the Medical University of South Carolina Library.

Additionally, the National Association of Community Health Centers (NACHC) provides data that looks at the impact of FQHCs at the state and national level. The most current version of these findings were found to be relevant and helpful for the purpose of this literature review. Medicare reimbursement rates for HBPC-associated visits were also reviewed for 2016 to compare the financial implications and sustainability of HBPC in FQHCs.

All searches for this literature review were conducted from September to December 2015. This search resulted in approximately 50 articles relevant to the research questions. Additionally, information was obtained from professional and governmental websites from organizations such as Centers for Medicare and Medicaid Services (CMS), HRSA, Bureau of Primary Healthcare (BPHC), and NACHC.

History of home-based primary care

While some may have memories of the family doctor coming to their home with their black medical bag, with the rapidly changing healthcare environment, these have historically become increasingly rarer in healthcare. In fact, house calls dropped from 40% of physician encounters in 1930 to 10% by 1950 and less than 1% by 1980 (Kao et al., 2009). With this change in volume of house calls, the nature and purpose of the house calls has also had to change. The primary patient audience became the frail and disabled

patients that were unable to come in to the clinic-based model of care (Kao et al., 2009). This has led to an increased presence of geriatric specialists in this market due to the attention being paid to homebound seniors. These clinicians who provide HBPC for elders in the United States represented only 18% of the total physician population in 2001 and made an average of five HBPC visits per week (Kao et al., 2009). This is much different from other countries in our approach to HBPC. In England, physicians make 10 times the number of HBPC visits per 1,000 patients per year compared to United States physicians and 100 times as many HBPC visits to patients older than 85 years old (Kao et al., 2009).

With this patient population that is significantly skewed in age and potential medical conditions, the indications for making a HBPC visit have focused more on chronic disease management, acute illness, end-of life care, pronouncement of death, and convenience for patients and caregivers for hard to transport patients (Kao et al., 2009). Sometimes, these visits are partnered with home health visits, but often home health nursing and therapies are not closely followed by the primary care provider (PCP) and home health agencies are not required to have a medical director on staff. Another challenge that is growing for HBPC visits is the current and project shortage of primary care and geriatric providers. Between 1995 and 2005 there was a 40% reduction in graduates entering family medicine and between 1998 and 2005, a 37% reduction in internal medicine residents who remained generalists (Kao et al., 2009). The prospect of future geriatricians is even bleaker, with only 54% of first-year geriatric fellowship spots being filled in 2006-2007 (Kao et al., 2009).

There has been a steady decline in the number of HBPC visits and there is an ever growing shortage of providers to see these homebound patients. However, with an aging populace and changes to Medicare billing codes and reimbursement rates, there has been a recent expansion of HBPC practices across the United States to help address the needs of these patients. Family practitioners continue to see the majority of HBPC visits and while there has been an increase in the number of HBPC visits, they are still less than 1% of all outpatient visits submitted to Medicare (Kao et al., 2009). However, there are still many benefits to patients from receiving a HBPC visit. As our healthcare system transitions from one that was volume-based to one that is more focused on value-based payment, it is important to see the value that comes to patients and the greater healthcare system when patients are receiving HBPC visits.

For many patients, the risk of not receiving a HBPC visit far outweighs the cost of these services. These type of visits allow for increased access to primary care, decreased utilization of urgent care and emergency care for nonemergent issues, and increased patient and family satisfaction with care (Agency for Healthcare Research and Quality, 2014). Additionally, by seeing a patient's home environment, clinicians can make better clinical judgements that are customized to the needs and capabilities of the patient and their support system which will possibly improve outcomes, increase the comfort level of caregivers and family members and potentially slow the physical and cognitive decline of patients (AHRQ, 2014). Directly related to these possible benefits to patients and their caregivers, are potential financial benefits to these same patients and the healthcare system as a whole. In previous studies, Medicare costs have seen significant savings when patients were enrolled in HBPC programs (Kao et al., 2009). One primary

contributor to these savings was the focus on not just acute issues, but also the underlying chronic disease that is much more prevalent in Medicare patient populations. As a result of these previous studies that have shown significant savings in healthcare costs, Kao et al. (2009), reports that some insurers are now partnering with HBPC providers to target patients who are stratified as a higher risk for increased emergency department (ED) utilization or unnecessary hospitalizations and providing HBPC in addition to office-based primary care as a way to meet the needs of the patient in a much more cost-effective manner.

Epidemiology of vulnerable populations

It is critical to understand that while HBPC has most recently been used for homebound patient populations, it has historically been used as another vehicle for delivery of primary care for patients of all ages. The rationale for reimbursement and allowance of HBPC visits in homebound patients is that they are particularly vulnerable to unnecessary ED visits, polypharmacy, poor coordination of care, and higher mortality than non-homebound populations (Ornstein et al., 2015). The patients who are most vulnerable in this homebound population tend to be older, female, and a racial minority (Ornstein et al., 2015). These same patients also tend to be less educated and have a lower disposable income than those individuals who are not homebound. These findings begin to incorporate many of the social determinants of health that are crucial when developing health policy and programs. The same risk factors that are seen in this vulnerable population are also reflected in other age groups across the continuum. For decades, vulnerable patient populations have struggled to access adequate primary care and have increasingly sought out FQHCs for their healthcare needs (Hawkins & Groves,

2011). As we look at FQHCs more closely in the next section, we will see that the medically underserved populations that call FQHCs their medical homes are often isolated, in many of the same ways as homebound patients, due to their socioeconomic status, ethnicity, insurance status, and geographical location (Hawkins & Groves, 2011).

Impact of Federally-Qualified Health Centers on the health system

To better understand the role that FQHCs play in the health system, we must first understand the genesis of this movement and how these centers have become not just a crucial part of the health safety net, but the American health delivery system. The FQHC movement started in Mississippi and Alabama in 1965 as a solution to provide care to the African-American patients who were unable to access care (Hawkins & Groves, 2011). These centers became integral to the communities in which they served, providing primary care, dentistry, behavioral health, education, and advocacy for the most challenging of patient populations. Over the next 50 years, the number and reach of community health centers has exploded to current totals of almost 23 million patients (NACHC National Data, 2016). The population characteristics include 92% of all FQHC patients living under 200% of the Federal Poverty Guidelines. Additionally, 47% of FQHC patients are on Medicaid and 28% are uninsured, compared to 19% and 10% in the general U.S. population (NACHC National Data, 2016). Patients are also significantly more likely to be Hispanic or African-American if receiving care at a FQHC compared to the general U.S. population (NACHC National Data, 2016).

As these FQHCs continued to provide comprehensive services to vulnerable populations, a strong group of bipartisan supporters began to see the value of the centers in helping to improve access in a cost-effective manner. Significant funding increases

were passed during the George W. Bush administration as well as with the passage of the PPACA under President Barack Obama (Hawkins & Groves, 2011). Additionally, the Institute of Medicine (IOM) and Government Accountability Office (GAO) have identified the important value that FQHCs bring to the American health system and provide medical care to patients at a cost of \$516 annually and dental care at a cost of \$439 annually (NACHC National Data, 2016).

As HBPC has shown to be an effective model for vulnerable populations, FQHCs have continually shown that they provide high-quality, cost-effective care as well. In 2015, the economic impact of FQHCs on the health system, through reductions in ED visits, unnecessary hospitalizations, and specialty referrals saved the U.S. health system \$24 billion (NACHC National Data, 2016). This equates to an average cost-per-patient that is a dollar less per patient per day compared to all other physician settings (NACHC Fact Sheet, 2015). In North Carolina, FQHC patients have 62% lower healthcare spending than patients of other providers and in Georgia the mean annual rate of ED visits for uninsured patients is 25% less in counties with a health center compared to those without (NACHC Fact Sheet, 2015). In Ohio, the FQHCs not only provide care to over 550,000 medically vulnerable patients, but they also employed over 3,275 FTE healthcare providers and provided an economic impact of \$1.2 billion to the economy of Ohio (NACHC State Level Data, 2016). Some of these economic contributions are direct and others indirect. A primary contribution to the local economy is the provision of employment to qualified healthcare providers. FQHCs have recently experienced a resurgence in the primary care market and have seen an increased appetite for

partnerships from hospital systems and independent providers who may be interested in the patient-centered care that happens in FQHCs (Schwartz & Patten, 2013).

Additional literature goes on to show that FQHCs have historically provided care to some of the most vulnerable and hard to reach groups such as migrant farm workers and homeless patients (Proser, 2005). Innovative approaches by FQHCs have resulted in improvements in multiple health outcomes, reductions in the frequency of low birth weight infants in minority populations, and improvements in the coordination of care (Proser, 2005). Another area where both FQHCs and HBPC have similar strengths is in the area of chronic disease management. In a recent demonstration for HBPC, CMS showed that their Independence at Home (IAH) initiative was able to save over \$25 million by improving coordination of care, increasing access for patients after hospitalization or ED visit, and better managing chronic diseases such as diabetes, hypertension, and asthma (CMS, 2015). In a study by the South Carolina Primary Health Care Association, an FQHC in South Carolina was found to provide care to state employees and Medicaid patients who were diabetic at a rate that was $\frac{1}{4}$ the cost of other providers (Proser, 2005). These same patients were also less likely to utilize the ED and require hospitalization for their chronic diseases. It is these strengths that have made FQHCs more attractive to payers and hospital partners for future collaborative efforts and innovative approaches to delivering primary care services to these underserved populations (Patton, 2010).

Nonmedical factors of care outcomes

One area where both FQHCs and HBPC providers excel, is in helping to uncover and address the nonmedical factors of care. Social determinants of health are often just as critical to the outcomes of a patient as the actual medical or behavioral health diagnosis. Whether it is a patient's physical inability to drive with the homebound patient population, or the inability to access transportation due to economic or geographical limitations in the FQHC patient population, nonmedical factors can lead to poor outcomes and prolonged suffering in patients. In a study looking at urban underserved populations, those who were homebound often remained hospitalized longer than non-homebound patients and in 32% of these patients, the reason for the prolonged hospitalization was not due to medical acuity, but rather complications with coordination of care or securing appropriate referrals for follow-up care (Foer, Ornstein, Soriano, Kathuria, & Dunn, 2012). One recommendation from this study would be to consider a more integrated, interprofessional approach to providing care to these patients to help better address the multi-faceted problems that complicate the health of these patients.

Home-based primary care: Removing healthcare access barriers

There are multiple models for how HBPC fits into the primary care arena, with options including comprehensive HBPC for homebound patients who are unable to access primary care in traditional settings, to transitional care programs, to concierge practices (DeCherrie et al., 2012). The HBPC model has long been championed by the VA as a viable delivery model for certain veterans and has also seen a resurgence in the academic health centers across the United States. While the VA HBPC program has shown to be effective at improving quality metrics as well as patient satisfaction

measures, academic health HBPC programs also help serving medically at-risk populations while helping to train the next generation of HBPC providers (DeCherrie et al., 2012). These different models have been forged due to the need to provide care to patients that helps to eliminate many of the barriers that we have described. Whether comparing the VA HBPC program and the success that they have found in reducing absolute risk for homebound veterans of hospitalization by 5.8% (Federman & Soriano, 2014), or academic programs such as the Mount Sinai Visiting Doctors (MSVD) Program in New York achieving an 80% influenza immunization rate and 74% pneumococcal immunization rate in their patient populations that far exceeds the industry standard for this patient population (K. Ornstein, Hernandez, DeCherrie, & Soriano, 2011), there are still many significant barriers to patients and how HBPC can be maximized for all medically underserved populations (Rice, 2015).

Further work is needed to not just show the cost-effectiveness of HBPC in the primary care arena, but to the overall cost of care to patients and healthcare utilization across all delivery sites. In the MSVD program, one of the key factors that was found to help capture the true scope of work that was being done to remove barriers for patients and help drive down overall costs, was intense care coordination and case management. By closely monitoring patient utilization of health resources, MSVD could provide accurate, actionable data for educating policy makers and healthcare leaders to the financial importance of HBPC programs for medically underserved populations (Smith, Ornstein, Soriano, Muller, & Boal, 2006). The next portion of this literature review will begin to look at how HBPC has been successfully utilized in the past for specific patient

populations that are at risk, including veterans, asthmatic patients, pediatric patient populations, the elderly, and patients with congestive heart failure (CHF).

Home-based primary care in the Department of Veterans Affairs

The VA first started a HBPC program in 1970, and what started as a six hospital demonstration project has grown into a program that includes 116 HBPC programs that provide care for over 12,500 veterans per year (Cooper, Granadillo, & Stacey, 2007). The original concept did not seek to replace brick and mortar VA primary care clinics, but rather to help remove barriers for chronically ill, homebound veterans who could no longer access care in these traditional sites. With this initial concept, the program has went through significant growth and changes. One primary focus of the VA model is that it is comprehensive primary care that is delivered in an interdisciplinary team approach (Cooper et al., 2007). This model includes medical staff, nursing staff, social workers, dieticians, pharmacist, and administrative support that all coordinate and manage the care of these veterans on a routine basis. A primary goal is this approach is to allow veterans to remain in their home as long as they are able and safe in this environment. This intensive HBPC follow-up model resulted in a 27% reduction in hospital admissions in 2007 and a 69% reduction in inpatient days of care after enrolling in the HBPC program (Cooper et al., 2007). Additionally, the total cost of care for these veterans was reduced by 24%, from \$38,000 per patient per year to \$29,000 (Edes et al., 2014). On top of VA cost savings, many veterans also are Medicare enrollees and recent findings support reductions in both VA and Medicare spending for patients in the VA HBPC program (Edes & Burris, 2014). With this type of cost savings, quality outcomes, and patient

satisfaction, it is critical that we begin to look at other areas where this style of care may be beneficial.

To put these numbers in context, 2% of all veterans account for 36% of all VA healthcare costs and 7% account for half of all VA costs (Edes et al., 2014). This correlates with the idea of disproportionate costs being attributed to a small percentage of the total population. In fact, 5% of all Medicare recipients generate 50% of the total expenditures for Medicare (Edes et al., 2014). In one review by Edes et al. (2014), by implementing HBPC in dual-eligible populations, patients that received care at the VA but were also Medicare recipients, saw a 16.7% reduction in VA costs and a 10.8% reduction in Medicare costs. The primary driver in this reduction of costs was fewer days in hospital beds (Edes et al., 2014). This is not to say that there aren't additional costs with HBPC programs. In the VA program, participants average 2.9 HBPC visits per month, but this still translates to an overall cost savings due to the decreased costs from hospitalizations. To take the findings from this study, if HBPC was implemented nationwide to all Medicare patients, it would translate to \$4.8 billion in savings (Edes et al., 2014).

The common theme that is seen across the HBPC practices and FQHCs is the patient-centered focus on removing barriers and maximizing access for patients. As healthcare continues to adjust to the reforms from the PPACA, it is critical to realize the importance of meeting the needs of patients to access healthcare. This may mean different modalities for delivering care. It may mean expanded days and hours for traditional primary care services. It will most certainly include further adoption of technology in the primary care space, such as telehealth and web-based services such as

messaging between patients and providers (Nelson et al., 2014). By providing patient-centered solutions, either in the form of a PCMH or accountable care organization (ACO), health systems must meet the changing demands of their populations. And when providers do this successfully, the patients have better outcomes. In the VA, patients who regularly were engaged with primary care, HBPC or OBPC, were much less likely to be admitted to the hospital in the subsequent year (Nelson et al., 2014). In this same study by Nelson et al. (2014), continuity of care was associated with a lower mortality rate in general, and those that were engaged with additional services that were working interprofessionally with the physician or nurse practitioner saw an even greater improvement.

While care must be patient-centered and effective it also must be financially sustainable to ensure continued provision of these services to patients. The VA has shown over the past 40 years that the HBPC model is not only effective for some populations who historically are utilizing the majority of healthcare resources, but it has potential to be expanded to many of the other at-risk patients across the United States (Wharton et al., 2013).

Home-based primary care in pediatric populations

As we focus more on the outcomes of entire populations, we must start looking at possible interventions that would be beneficial to these underserved groups. One area where some research has already been conducted on this is in the area of pediatric patients utilizing care for well-child exams. For low-income children, they have harder times accessing preventative exams and are less likely to meet on-time immunization guidelines and are more likely to suffer poor health outcomes (Brown, Perkins, Blust, &

Kahn, 2015). In this same study, it was found that children who were historically worse at getting preventative exams on time and were having worse outcomes due to significant social determinants of health, improved from 68% to 79% for attending their 2-month well-child exam and improved from 35% to 59% for attending the 4-month well-child exam (Brown et al., 2015). Another crucial finding centered on the need for future expansion of innovative, community-based, patient-centered approaches to getting pediatric patients in underserved populations engaged into primary care (Brown et al., 2015).

In addition to improving attendance of patients to preventative exams, there is also research that suggests that pediatric patients that have asthma can experience better control and better outcomes when enrolled in a program that incorporates home visits. Nearly 14% of all pediatric hospital admissions are caused by asthma and African-American children are 2.5 times more likely to require hospitalization compared to Caucasian children (Sommer et al., 2011). As previously discussed, the social determinants of health such as poverty, housing, school conditions, insurance status, and transportation are all factors that can contribute to a child not receiving adequate asthma treatment and education. A program in Children's Hospital Boston, known as the Community Asthma Initiative (CAI), enrolled medically underserved populations and worked with an interprofessional team to address the underlying disease as well as many of the social determinants of health. The results showed reductions in hospitalizations and ED visits and a return on investment (ROI) of 1.46 (Sommer et al., 2011). In Massachusetts, this data was then used to influence policymakers to allow for a bundled payment pilot to reimburse for quality outcomes.

Home-based primary care in asthmatic populations

One of the biggest barriers for asthmatic patients is proper education about the disease, maintenance medications, and appropriate self-management of the patient's symptoms. Nearly 7 million children in the United States have asthma and many of these children are not appropriately controlling their condition (Campbell et al., 2015). Several programs have looked at and found the use of community health workers (CHWs) to be effective in helping to educate patients and their parents about the appropriate self-management and treatment of asthma. The benefits of home visits include seeing the physical location in which the patient lives and breathes on a regular basis and being able to remove some of the largest barriers for patients accessing quality asthma education. The CHWs are part of an interprofessional team, and while they themselves are not medical and are not making any clinical judgements, their vital role includes educating patients on their asthma and how to better manage it. With this intensive, enhanced asthma management program, a large population of asthmatic children in King County, Washington were able to achieve better outcomes with their asthma, fewer urgent care visits, better satisfaction for caregivers, and a ROI of 1.90 (Campbell et al., 2015).

While asthma is a disease that often first manifests in pediatric populations, it often persists for patients into their adult lives. The struggle to maintain adequate control often manifests into multiple trips to EDs and may require hospitalizations. Again, evidence shows that of the 17.5 million adult asthmatic patients, those that are of lower socioeconomic status are significantly more at risk for complications and higher cost of care due to limited access to education, primary care, and proper medications (Krieger, Song, & Philby, 2015). In the HomeBASE Trial study, CHWs were again used for low-

income, uncontrolled asthmatics in King County, Washington, but this time for adult patients. These patients averaged about five home visits over the course of a year and also were found to have better asthma control and quality of life (Campbell et al., 2015). Interestingly, with this study, there was no improvement in unscheduled health care use, but future studies will help to see if there is any significance to this or if further implementation to underserved asthmatics is a financially viable model of quality care.

Home-based primary care in elderly populations

As we have shared earlier, one of the reasons why HBPC is a critical tool for elderly populations is their significantly higher incidence of multiple chronic conditions and are often unable to access transportation in an effective manner (Auer & Nirenberg, 2008). In this vulnerable population, specific attention must be paid to managing the multiple chronic conditions and medications and treatments that correspond with these conditions as well as making sure patients are comfortable and engaged in their treatment plans (Auer & Nirenberg, 2008). In this particular model, as well as in some capacity with many of the HBPC models, the clinical provider that most often provides these types of services are NPs. The NP works with the other healthcare providers in a team-based approach to make sure the patients are properly cared for and able to maintain their independence in a safe and comfortable environment.

The IAH project that is ongoing as an initiative through CMS has already shown that this elderly population can receive better care outcomes in a cost-effective manner (CMS, 2015). The savings that are realized with this program, partnered with improvement in quality metrics will not only benefit patients, but will also create shared savings that will then be split between Medicare and the 15 independent practices in the

IAH demonstration (Blum, 2013). In one study in the Journal of the American Geriatric Society, it was able to demonstrate that a HBPC practice in Washington D.C. was able to effectively reduce Medicare costs in the frail, elderly population while still having similar mortality and time of death (Eric De Jonge et al., 2014). One key difference with this model is that many of the physicians on the interprofessional team also follow their patients into the hospitals and there is also a significant social work component to this team that helps to address many of these social determinants of health that can complicate the patient's already fragile medical conditions (Eric De Jonge et al., 2014). In another study that looked at the use of NPs in a HBPC program in Canada, participants in the HBPC group made less ED visits at 2 weeks and 4 weeks in the program (Tung, Kaufmann, & Tanner, 2012). The overall conclusion was that the HBPC program was effective at reducing ED use in this elderly patient population.

Home-based primary care in congestive heart failure patients

CHF is a progressive, chronic disease that significantly impacts the quality of life and cost of care for patients that suffer from this disease. It is one of the most common diagnoses for Medicare patients as well as veterans in the VA system and is notorious for having staggering ED visit rates and hospitalization rates (Colandrea & Murphy-Gustavson, 2012). One area where payers and health reformers have looked to improve care coordination is by stopping payment to hospitals when a patient is readmitted for the same diagnosis that they were previously admitted to the hospital for in the previous 30-day time period. One of the biggest disease offenders for multiple readmissions is CHF.

This is why there have been multiple studies and HBPC programs that have focused on CHF patients and the potential benefits to clinical outcomes and decreased healthcare costs in this model. The VA has created a specialized HBPC team that works as an interdisciplinary team to address the specific needs of this patient population and was successful in reducing hospital readmissions for CHF by standardizing care protocols and patient education and making sure patients were enrolled in a proactive follow-up plan (Colandrea & Murphy-Gustavson, 2012). As the population of the United States continues to age and enjoy longer years of life, it is crucial that we develop programs that embrace the unique challenges and needs of this population. By 2050, over 15% of the population will be 65 and over, which translates to over 20 million Americans over the age of 85 (Shah, Tsai, Klein, & Heidenreich, 2011). If FQHCs want to help meet these needs for their communities, HBPC will need to be a consideration in patient-centered solutions.

Home-based primary care in palliative care

Another group of underserved and at-risk patients are those nearing the end of their lives. These patients often have many chronic conditions but may not need or be eligible for hospice programs and in many underserved areas, inpatient palliative care programs may not exist. Initial studies have shown that by implementing a HBPC program for patients with advanced complex illnesses (ACI), they were able to see significant reductions in hospital utilization (Lukas, Foltz, & Paxton, 2013). While palliative care is a fairly new service line in the healthcare arena, with the aging population it would appear to be another patient population that would benefit from the delivery of care in the patient's home environment.

In another study, specific symptoms were measured to see the extent to which HBPC was successful in meeting patients' needs. In this study, pain levels, anxiety levels, depression, appetite, and shortness of breath were some of the symptoms that were measured and significant improvements to pain, anxiety, depression and fatigue were realized at 3 weeks and 12 weeks post enrollment in the HBPC program (Ornstein et al., 2013). A meta-analysis of palliative care patients who desire to not only have HBPC but also to die in their homes also found that these patients report decreased symptom burden and greater likelihood of dying in their homes than in programs that did not provide home-based programs (Gomes, Calanzani, Curiale, McCrone, & Higginson Irene, 2013).

Team-based care in home-based primary care

One of the primary tenets of the HBPC and FQHC models is that it embraces the team-based approach of providing care to patients. In study after study, one of the ways that HBPC is able to be effective in improving patient satisfaction as well as decreasing hospital utilization is through a team-based approach, especially in medically underserved populations (Hughes et al., 2000). This multi-faceted approach is helpful because of the psychosocial components of each patients care that factors into the overall care plan, whether discussing a homebound patient (Reckrey et al., 2015) or an otherwise underserved and vulnerable patient population, such as those that seek care at FQHCs. This model has been widely adopted in centers that have been recognized at PCMHs, but this may further change staffing models, such as those used at the Mount Sinai Visiting Doctors (MSVD) Program (Reckrey et al., 2015). Additionally, Reckrey et al, show that HBPC, specifically when delivered with a team-based approach, delivers care at a lower overall cost for staffing (2015).

While some aspects of team-based care may all be in one organization, such as with the MSVD team, there are also additional teams that may be comprised of different providers and specialties that are not under the umbrella of one organization. One area where we see the necessity for a team-based approach is between the HBPC team and home health providers. There is often confusion about the differences in services provided with a HBPC program and those provided from home health nursing and therapies. While HBPC is comprehensive primary care, it is often beneficial for HBPC patients to also receive nursing and therapy services in their homes. There are different models to how this team building occurs and a variety of business arrangements to best maximize reimbursement and coordination of care. Some home health agencies have sought to add HBPC providers as another service line in their organization, while others have integrated outside social service agencies to create a synergy and help to coordinate care and expedite referrals (Row, Braveman, Fasten, Alston, & Yudin, 2006). Another study found that interprofessional HBPC teams in Canada were only high performing if they developed a shared vision, common goals, respect, and trust through effective communication and conflict resolution (Smith-Carrier & Neysmith, 2014). So whether considering implementing HBPC in an FQHC or elsewhere, the leadership team of the healthcare organization must be deliberate in communicating the vision and purpose of the program and what the goals are for patients, providers, and all team members. This applies not only to the internal team members, but other care team members that may be outside of the organization.

Technological implications in home-based primary care

When considering whether implementing HBPC in FQHCs is financially viable or not, one specific area that can seriously impede the financial and clinical success of a program is the role that technology can play in the HBPC practice. Items such as medication reconciliation, verification of allergies, and review of labs would not be possible without readily accessible patient records. In addition to an electronic health record (EHR), mobile connectivity of the interprofessional team is a must to ensure that coordination of care and communication between healthcare providers is done in real-time. In the VA HBPC program, their EHR allows for better coordination of care, better access to patient records, and reduction in potential errors related to being unable to read handwritten notes or orders (Shea, 2007). However, while this technology has improved many aspects of delivery in the HBPC model, it is also a costly endeavor and productivity can be compromised when there are connectivity issues.

Financial implications of home-based primary care

For the purpose of this study and literature review, the primary focus is looking at whether or not HBPC has been shown to be cost-effective. The assumption is that while there would be increased spending with expansion of HBPC programs, FQHCs should be able to use this program as a tool to mobilize population health management, and this benefit would far offset the increased financial investment to primary care and the FQHC program. In a study of medically complex children who are covered by Medicaid, cost savings in reduction of ED visits, savings from hospitalizations for ambulatory care-sensitive conditions (ASC), and savings from decreased hospital days could contribute to an overall 255% increase in funding for primary care (Berry et al., 2014). There are other examples of innovative programs showing that evidence-based approaches to care can be

not only clinically beneficial, but financially viable as well. In one study that was founded by the Robert Wood Johnson Foundation, the Center for Health Care Strategies, and the Commonwealth Fund, programs such as complex case management for adults with multiple comorbidities, asthma education for children with high ED utilization, prenatal programs, and programs for adult diabetic patients all showed to have a positive ROI (Greene et al., 2008). Many of these programs are already included in core services that FQHCs provide and could be augmented with HBPC visits.

One area where HBPC has shown to be especially helpful is in reducing the number of ASC visits to EDs for a variety of patient populations. One demographic that receives care in FQHCs at higher proportional rates than traditional locations, is the Medicaid and uninsured populations. Medicaid patients are actually twice as likely as someone that is uninsured or privately insured to have an ED visit (Mortensen & Song, 2008). This is often attributed to poor access to primary care services and a pattern of utilizing care in this manner, which is disjointed and significantly more costly to the system. What this study by Mortensen & Song (2008) also found, was that in order to help decrease ED visits for ASC in Medicaid populations, it must also address educating participants on how to properly access care, what services are available to them with their Medicaid coverage, and why they should be seen in primary care versus the ED for ASCs. These education and enabling services are routinely provided in FQHCs across the United States as a standard service to their patients and would help to not only provide access to these patients but also help reduce overall costs (NACHC National Data, 2016).

Specifically regarding HBPC and financial viability, there have been multiple studies that have looked at whether HBPC can attain cost savings to the health system.

One study of an NP-led HBPC program found that over a 12 month period, enrollment of elderly patients with multiple comorbid conditions resulted in a total cost savings of almost \$1.1 million (North, Kehm, Bent, & Hartman, 2008). The other pertinent finding from this study showed that current Medicare and private insurance reimbursement for traditional HBPC is suboptimal and could be a barrier to further expansion of HBPC programs to underserved populations (North et al., 2008). Another financial consideration that is a crucial component of HBPC programs is care that occurs outside of the actual visits. Non-reimbursable time spent completing tasks such as reviewing labs, traveling from appointment sites, and coordinating care with other interprofessional team members are all necessary in providing patient-centered care, but could threaten long-term sustainability of HBPC programs if not correctly identified and reimbursed. As part of the IAH demonstration currently underway with CMS, it has been identified that many critical healthcare decisions are made outside of the reimbursed visit and in future payment models this will need to be considered in the rate-setting process to fairly account for the care being provided (Pedowitz, Ornstein, Farber, & DeCherrie, 2014).

Other studies have looked at the introduction of specialty services to FQHCs through telemedicine delivery options. Not only was the telemedicine-based collaborative care (TBCC) method of depression care more cost-effective in rural FQHCs, but it also resulted in more depression-free days and quality-adjusted life years (QALYs) (Pyne et al., 2015). The costs for these FQHC visits were based on the state PPS rates for Arkansas. The PPS is the method by which FQHCs are reimbursed for the comprehensive care they provide to their underserved populations. It is considered an “enhanced” reimbursement and is often significantly higher than traditional fee-for-service Medicaid

rates. This study is important, because a key component to HBPC and FQHC care is provision of behavioral health services, and this shows that innovative approaches can not only be effective but cost-effective as well. Another underserved population that has seen improvement in outcomes with HBPC programs are those patients that are in geographically-underserved areas. Patients in urban areas are often unable to routinely access primary care, resulting in higher rates of hospitalizations and nursing home placements for elderly patients. In one urban, HBPC program, after enrollment of patients, there was a 23% reduction in hospitalizations and a 20% reduction in nursing home placements (Wajnberg, Wang, Aniff, & Kunins, 2010). The key factors that helped to drive these reductions were identified as improved access to health services as well as 24-hour availability to the interprofessional care team members (Wajnberg et al., 2010).

One review in *Health Policy* looked at how effectively we can assess the cost-effectiveness of public health interventions. Of the 154 studies that were identified, the authors found that many of these reviews did not accurately attribute effects, measure and value outcomes, consider intersectoral costs and consequences, and consider matters of equity (Weatherly et al., 2009). This is of importance because as we consider the financial viability of implementing HBPC in FQHCs, we must make sure to consider these measures. One final article that is pertinent to this review looked at the public health challenges that affect medically underserved populations. A major area where medically underserved populations lag is the area of preventative services. In traditional primary care, we are not meeting the needs for preventative services with 33% of women and 40% of men over the age of 65 not fully up to date with preventative services (Zaldivar, A. & Bohnarczyk, N., 2013). With new reimbursement models on the horizon,

HBPC could provide a method for FQHCs to collect revenue from PPS rate visits with FQHC providers. Also, improved outcomes could lead to improved quality metrics and potential for enhanced reimbursement and additional funding opportunities from payers.

Comparing school-based primary care to home-based primary care

Another innovative approach to population health management that also has a history in the FQHC movement is the provision of medical, dental, behavioral health, and vision services to medically underserved populations in school-based health centers (SBHCs). It is important to understand the similarities between SBHCs and HBPC in terms of possibilities and opportunities to remove barriers to care and improve patient outcomes. One study looked at Medicaid claims data of patients receiving care in a SBHC compared to those that were not. The patients who received care at the Whitefoord Elementary School-Based Health Clinic (WESBHC) in Atlanta, Georgia had significantly lower ED visits and expenses (Adams & Johnson, 2000). In addition to these savings, asthmatic patients who accessed care at WESBHC saw a reduction in their cost of inpatient care, from \$1,259 for nonparticipants, to \$352 for SBHC participants (Adams & Johnson, 2000). Other items that are not as easy to quantify such as reduced travel time, decreased time off work for parents, and increased school attendance are also an indirect benefit to the communities where SBHCs are implemented.

Patients and parents also view the care provided at SBHCs as comprehensive and patient-centered. In a qualitative study looking at SBHC patients in the Denver Public Schools, focus groups looked at the perceived quality of care that they received from SBHCs. The results from students and families showed that SBHC were viewed as patient-centered and often scored higher in being accessible and fostering a trusting

provider-patient relationship (Albright et al., 2015). The care was characterized as “comprehensive”, “coordinated”, “compassionate”, and “culturally-effective”. This is the mission of the FQHC program and our literature review shows that HBPC can be a crucial piece in these efforts. SBHCs also are leading in efforts of prevention and improved outcomes in pediatric populations. Obesity prevention, asthma management, and improved oral health access are some of the clinical areas where SBHCs are making an impact on the health of our nation’s children (Clayton, Chin, Blackburn, & Echeverria, 2010). In addition to helping to improve access to care for patients, school staff, and family members, SBHCs also become an integrated part of a school system and help to educate and engage these community members in preventative health measures (Clayton et al., 2010).

Another study out of the *Journal of Adolescent Health* found that not only did SBHCs improve access to students, but it made a positive impact on the health of the entire school population, with an even greater impact on those students that were receiving care at the SBHC (Gibson, Santelli, Miguez, Lord, & Schuyler, 2013). Patients who were utilizing this SBHC were more likely to better understand the importance of accessing routine, preventative care for their medical and behavioral health needs (Gibson et al., 2013). Due to the patient population and need for collaborative, community-focused care in these SBHCs, 28% of all these type of delivery sites are operated by FQHCs (Keeton, Soleimanpour, & Brindis, 2012). These sites also must maintain a population health focus that looks at ensuring patients receive preventative care, chronic disease management, and education to decrease overutilization of more costly care in the form of ED visits for ASCs. This also helps to address racial disparities in accessing primary care as SBHC patients are

70% racial or ethnic minorities (Keeton et al., 2012). Additionally, students that received care in SBHCs were more likely to be up-to-date on their immunizations, demonstrate better asthma control, and have better access to screening and treatment for alcohol, tobacco, and substance abuse (Keeton et al., 2012).

The services provided by SBHCs can often be accessed by patients that may already be seen at an FQHC for their primary care needs. In fact, national data shows that 1.1 million U.S. students access primary care services at SBHC and while there is a mix of commercially insured and Medicaid patients, 51.4% of all SBHC patients reported that as their only source of care (Klein et al., 2007). Of the 78.4% of Medicaid patients who said that they received care somewhere in addition to the SBHC, almost 20% of the time that was at another FQHC primary care site (Klein et al., 2007). This study also found that adolescent patients felt that the care provided in this type of delivery model was more patient-centered and pertinent to their specific needs. That is why there is a growing push from policy makers and healthcare organizations to allow SBHCs to be considered PCMHs and participate in ACOs. Specifically in uninsured and underinsured populations, SBHCs are seen as medical homes for patients and their families, and have shown that their expanded access prevents unnecessary ED visits and urgent care encounters (O'Leary et al., 2014).

Additional benefits that have been documented in adolescent populations that receive care in SBHCs, are reductions in Medicaid spending, reduced absenteeism from school, reduced dropout rates and school-related behavior problems, and improved health outcomes for patients with chronic disease (Parasuraman & Shi, 2014). Areas for improvement still exist, especially with this age group. Of concern was a study that found

that 80% of all adolescents had at least one physician visit in a given year, but less than 20% of these adolescents received the recommended preventative services (Parasuraman & Shi, 2015). In this same study, Parasuraman & Shi found that utilization of preventative services were particularly low amongst African-American and Hispanic adolescents (2015). An indicator that shows the importance of this delivery model centers around the finding that students that had a well-child exam at the SBHC were more likely to be African-American or Hispanic compared to the Caucasian students (Parasuraman & Shi, 2015).

As healthcare leaders and innovators, we must consider patient needs when developing models of care in a health reform environment. A study that speaks to this found that the number one reason that students liked SBHCs was the privacy and confidentiality (62%), followed by the convenient location (56%), and convenient hours (43%) (Soleimanpour, Geierstanger, Kaller, McCarter, & Brindis, 2010). Additionally, there is a definite connection between physical, dental, vision, and behavioral health and academic performance. One study found that middle and high school students who accessed care in the SBHCs were more successful in their academics. In fact, these students' GPAs were 2.5 points higher than students who did not access care at the SBHC (Strolin-Goltzman, Sisselman, Melekis, & Auerbach, 2014). The same study found that there was a 90% passage rate from one grade to the next when a student was a SBHC utilizer, compared to 83% in the non-SBHC utilizer group (Strolin-Goltzman et al., 2014).

A final study that was reviewed looked at the value of SBHCs to the healthcare system. A 3-year longitudinal study looked at 290 students in a SBHC program in Cincinnati, Ohio and found that there were significant cost reductions related to

improvements in physical and psychosocial health-related quality-of-life (HRQOL) when students accessed care at the SBHC (Wade & Guo, 2010). If the savings from improved HRQOLs in this population was actualized across all SBHCs and in other innovative models such as HBPC for these same vulnerable populations, the potential savings for Medicaid would be substantial.

Conclusions

While there is no specific literature looking at the issue of financial viability of implementing HBPC in FQHCs across the United States, there was sufficient literature to review regarding the implementation of innovative models of care that increase access to underserved populations across the United States. Looking at the effectiveness and sustainability of HBPC in a variety of populations, the role of FQHCs and how they address the needs of underserved populations in a patient-centered approach, and other models such as SBHCs, the foundation is now there to evaluate whether or not there is an opportunity to improve the health of FQHC patients by implementing HBPC. The findings of this literature review indicate that further analysis is warranted to project if this model would be financially viable and produce improved outcomes in vulnerable populations.

CHAPTER III: METHODOLOGY

Study Design and Hypotheses

A retrospective cross sectional analysis of FQHC cost-per-patient data was conducted to analyze the financial sustainability of HBPC in FQHC settings. The primary aim of the study was to evaluate the economic feasibility of implementing HBPC in an FQHC. The cost of delivering care, clinical outcome measures, and other demographic measures such as race, ethnicity, age, sex, and payer source were all measured. Relationships between chronic disease conditions, cost-effectiveness, and demographic characteristics were evaluated.

This study's research hypotheses were designed to explore the financial viability of implementing HBPC in FQHCs and to determine if implementation of this primary care delivery model for underserved and high-risk populations could result in improved patient outcomes and population health management. Specifically, if this research can show it to be economically sustainable and clinically beneficial in improving the outcomes of high-risk patient populations, there are areas for future development of health policy and payment reform to ensure that FQHCs in all states would receive reimbursement for these type of services.

H₁: Variations in FQHC rates of asthma control, adolescent weight screening, diabetes control, and childhood immunizations may be expected to affect the financial viability of implementation of HBPC programs in FQHCs across the United States.

H₂: Current public FQHC reports can be used to predict the financial viability of implementing HBPC in specific locations.

H₃: Financial viability will differ within each FQHC for HBPCs aimed at asthma control, adolescent weight screening, diabetes control, and childhood immunization.

Population and Sample

All FQHC patient data from the Uniform Data System (UDS) for Ohio in the reporting year 2014 was used for this analysis. This data was accessed through the existing archival data available in the HRSA BPHC Data Warehouse. Upon receiving the data, a general overview showed that five of the original Ohio FQHCs had missing data for either financial measures or clinical measures and were then removed from this dataset. De-identified patient data was used, so this study was classified as non-human research by the Medical University of South Carolina (MUSC) Institutional Review Board (IRB).

This study population reflects the criteria that HRSA has set for being considered a FQHC patient (Hawkins & Groves, 2011). To be included in this empirical assessment, each FQHC in Ohio must have submitted UDS data for FY 2014 and have an adequate financial and clinical information. Exclusion criteria were applied to refine the study population. FQHCs that did not have any immunization, adolescent weight screening, asthmatic, or diabetic clinical data were removed from consideration. Data included all payer mixes and other demographic data. Figure 1 shows the study population with identification of inclusion and exclusion criteria.

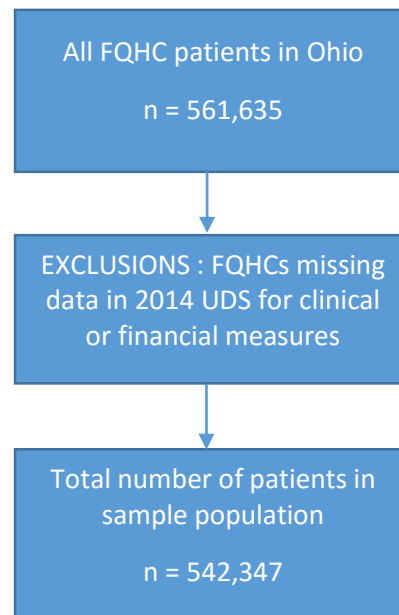


Figure 1. Inclusion and exclusion criteria for study population

Definition of Variables

Financial viability of implementing HBPC in FQHCs was the outcome on which this empirical assessment focused. Potential PPS encounter revenue was evaluated as well as potential quality incentive payments. Additionally, quality measures surrounding immunization rates, diabetic control, adolescent weight screening, and asthma control were variables in determining whether HBPC would be beneficial in helping patients and FQHCs improve on these measures and receive incentive payments from HRSA for quality improvement efforts. There are over 15 UDS clinical quality measures and for the purpose of this study we selected asthma control, immunization rates, diabetic control, and adolescent weight screening. These variables were selected due to their ability to be completed in a HBPC visit as well as their representative nature of FQHC patients. By selecting these four variables, we are able to analyze services for children,

adolescents, and patients with multiple chronic diseases. Some of the UDS measures, such as cervical cancer screening, are unable to be completed in a HBPC visit, therefore were not evaluated for clinical improvement possibilities or financial viability.

The UDS classifications for measures of asthma control included: Asthma patients age 5 through 40 with at least one medical visit during the reporting period of January 1, 2014 and December 31, 2014, and at least two visits ever, with a diagnosis of mild, moderate or severe persistent asthma (UDS Manual, 2014). UDS measures for childhood immunization rates are considered: children with at least one medical visit during the reporting period from January 1, 2014 to December 31, 2014, who had their third birthday during the reporting period, and who were first seen ever by the health center prior to their third birthday (UDS Manual, 2014). Adolescent weight screening criteria looks at: children and adolescents aged 3 until 17 with at least one medical visit during the reporting period, who had their third birthday during or prior to the reporting period, and who were first seen ever by the health center prior to their 17th birthday.

The final clinical measure to be considered was diabetic control of FQHC patients in Ohio. This data point is developed by looking at: a proportion of adult patients born between January 1, 1940, and December 31, 1996, with a diagnosis of Type I or Type II diabetes, whose hemoglobin A1c (HbA1c) was less than or equal to 9% at the time of the last reading in the measurement year of January 1, 2014 to December 31, 2014. Health centers report results in three categories: less than 8%; greater than or equal to 8% and less than or equal to 9%; and greater than 9%. The measure itself, which is not dependent on which category of failure to meet the measurement standard a patient falls in, is calculated as follows: The number of adult patients whose most recent hemoglobin A1c

level during the measurement year is < 9% among those patients included in the FY 2014 UDS Report submission from each FQHC divided by the number of adult patients aged 18 to 75, as of December 31, of the measurement year; with a diagnosis of Type I or II diabetes; and who have been seen in the clinic for medical visits at least twice during the reporting year (UDS Manual, 2014).

Data Set Description

Archival data from the 2014 Ohio FQHC Report of the HRSA UDS Data Warehouse is available with financial, clinical, and operational data surrounding FQHCs across the United States. This data is publically available and is reported on an annual basis as a condition of healthcare organizations participating in the FQHC program. The 2014 Ohio FQHC Report from the HRSA UDS Data Warehouse includes: age and race / ethnicity information, FQHC patient characteristics, FQHC services provided, clinical data, and program cost data.

Clinical data measures include prevalence of hypertension, diabetes, asthma, HIV, access to prenatal care, cervical cancer screening, adolescent and adult weight screening, tobacco screening and cessation efforts, colorectal cancer screening, childhood immunization rates, depression screening, and appropriate treatment for asthma, hyperlipidemia, ischemic vascular disease, hypertension, diabetes, and HIV.

Data Analysis

The data was reformatted and the names of the Ohio FQHCs were removed in order to deidentify these organizations. Additional data analysis looked specifically at areas for quality improvement with comparison of each FQHC in Ohio to the national average for FQHCs. The difference for each FQHC was then measured and recorded.

Analysis was completed to look at the total population of each FQHC and then determine the number of eligible patients who had asthma, were under the age of 18, or were diabetic.

Each respective clinical measure was then reviewed to calculate the number of potential visits that may be generated and subsequent revenue. For each measure, a specific factor was used to project how many encounters would be anticipated. For childhood immunization rates, we used a factor of 1.5, for adolescent weight screening we used a factor of 1.0, for diabetic patients a factor of 4.0, and for asthma patients a factor of 3.0. This number was then multiplied by \$100 as a general average of the PPS rate for FQHCs in Ohio. The rationale is that these encounters would otherwise not occur in an OBPC setting, so HBPC implementation would get patients the services they need and provide additional encounters for the FQHCs. This will not only improve quality outcomes for patients and communities, but help bring in critical revenue to the FQHCs. Overall, by implementing HBPC in these FQHCs, the potential revenue for FQHCs in Ohio would equal approximately \$72,000,000.

In addition, as healthcare reimbursement transitions to value-based reimbursement rather than volume-based reimbursement, there are opportunities for quality incentive payments for FQHCs. In order to properly assess the potential for these payments, we compared the award criteria from 2015 HRSA Quality Improvement Awards which were based on the same FY 2014 UDS Data to the compiled dataset. FQHCs have the opportunity to receive funding if they achieved the best overall clinical outcomes among all health centers, demonstrating a dedication to quality in all aspects of clinical operations.

- **Clinical quality improvers** received funding if they showed improvement in one or more clinical quality measures between 2013 and 2014, demonstrating a significant improvement to their patients' health.
- **Health center quality leaders** received funding if they achieved the best overall clinical outcomes among all health centers, demonstrating a dedication to quality in all aspects of clinical operations.
- **National quality leaders** received funding if they met or exceeded national clinical quality benchmarks, including Healthy People 2020 objectives, for chronic disease management, preventive care, and perinatal/prenatal care, demonstrating health centers' critical role in improving quality health care nationwide (Health Center QI Awards, 2015).

For the sake of this assessment, if an FQHC had a clinical measure score that was at or above the national average we projected they would receive a clinical quality improver award, a health center quality leader award, and a national quality leader award. In 2015, the award for each of these designations were \$17,630, \$33,359, and \$40,293 respectively. For Ohio FQHCs who were already at or above the national average for each clinical measure, we projected they would collect \$91,282 which would be all three of the quality improvement awards. If a FQHC was within 10% of the national average, we made the assumption that with the HBPC program implementation, we would see at least a 10% increase in necessary services, so we gave those FQHCs the potential for \$50,989 or the first two quality improvement awards. If an FQHC was further than 10% under the national average, we did expect an improvement in these quality metrics but were unsure whether they would surpass their peers in the state or nationally, so we

projected a quality incentive payment of \$17,630 for the quality improver award. In total, it is projected that in addition to reimbursement revenue for the encounters the included FQHCs in Ohio have the potential to see an additional approximately \$9,500,000 of revenue come into their centers by using HBPC as a tool in their population health management program. In total, with encounter revenue and potential quality improvement funds, there is a potential for the FQHCs in Ohio to see an increase in revenue of approximately \$81,500,000.

Potential Encounter Revenue	Potential Quality Improvement Revenue	Total Potential Revenue
\$ 72,000,000	\$ 9,500,000	\$ 81,500,000

Table 1. Financial Viability Projections

Potential Encounters	Potential Patients Seen
720,000	335,000

Table 2. Additional patient and encounter projections

Limitations

One potential limitation to this study is the fact that this data is directly reported from each FQHC to HRSA for tabulation. While there are very specific instructions on how to report this data, there are opportunities for misreporting of data. However, this is the most relevant and robust data available for FQHCs in Ohio at this time. Each patient has the ability not to participate in the FQHC HBPC programs and each FQHC may not choose to move forward with this model of care, but this is an empirical assessment to look at the potential benefit to each patient and organization. Additionally, only evaluating four of the UDS measures, while we felt these were representative of the general FQHC population, could limit the scope of this study. Another potential

limitation is the ability to generalize findings. While we pulled a significant data file for all FQHCs in Ohio that looked a wide variety of different racial / ethnic, financial, and geographical characteristics, these may not be reflective of all FQHCs outside of Ohio.

Protection of Human Subjects

In order to maintain the integrity of the research process and to ensure the protection of any human subjects, this study was submitted to the MUSC IRB as exempt research on August 16, 2015. After receiving departmental approval, the MUSC IRB approved this study as non-human research on September 8, 2015.

FINANCIAL VIABILITY OF IMPLEMENTING HOME-BASED PRIMARY CARE
PROGRAMS IN FEDERALLY-QUALIFIED HEALTH CENTERS IN THE U.S.: AN
EMPIRICAL ASSESSMENT

Stephen Roller, DHA Candidate, Medical University of South Carolina
Dr. Walter Jones, PhD, Professor, Medical University of South Carolina
Dr. Kit Simpson, DrPH, Professor, Medical University of South Carolina
Dr. J. Michael Benfield, MD, CEO, MD2U

Abstract

Home-based primary care (HBPC) has been shown to be an effective method of delivering primary care services to high-risk, high-utilizing patients. Federally-Qualified health centers (FQHCs) have historically provided, and continue to provide, comprehensive primary care for a majority of the medically underserved patients across the United States. Often times, the patients that access primary care from FQHCs may experience socioeconomic, behavioral, or physical factors that would make an elderly or home-bound patient eligible for a HBPC program. With increased focus on population health management and a much anticipated transition from fee-for-service to value-based payments, the implementation of this delivery model would seem to be an innovative method of removing barriers for medically underserved populations. The purpose of this research is to analyze the financial viability of implementing this model of primary care delivery in FQHC settings to help improve access to care and improve outcomes in a cost-effective manner.

Keywords: Home-based primary care, Federally-Qualified Health Centers

Introduction and Background

While home-based primary care (HBPC) is not a new concept in the healthcare profession, it is one that has previously been used in only very focused and limited applications. This model of healthcare delivery involves physicians, physician's assistants (PAs), and / or nurse practitioners (NPs) seeing a patient in their place of residence, be that a house, apartment, condo, trailer, or assisted living complex. The rationale behind this model of healthcare delivery is that if a patient is physically unable to access traditional office-based primary care (OBPC), they will more frequently utilize care in higher-cost settings such as the emergency department (ED), resulting in more fragmented care, increased hospitalizations, and poorer quality outcomes for patients (Kao, Conant, Soriano, & McCormick, 2009). This is exactly the opposite of the goal of the Triple Aim, which seeks to improve access to care, improve patient outcomes, and decrease overall cost of care across the healthcare system (Hawkins & Groves, 2011). The Veteran's Administration (VA) has historically used this model of healthcare delivery for a segment of their elderly veterans who have multiple chronic diseases and have difficulty getting to a traditional OBPC practice (Edes et al., 2014). Medicare has allowed for HBPC providers to see patients who are considered homebound and physically unable to safely access primary care without these specialized services, but the number of providers are limited and the age and the amount of chronic disease burden that these patients possess is not reflective of the entire populace (DeCherrie, Soriano, & Hayashi, 2012).

There is literature currently available that evaluates the clinical efficacy and cost-effectiveness of HBPC in elderly and VA patient populations, but there is no current

literature to look at the provision of HBPC by Federally-Qualified Health Centers (FQHCs) as a method of delivering primary care to patients. FQHCs serve a disproportionate amount of medically underserved patients, often with significant chronic disease burden, many confounding social determinants of health, and either no health insurance, Medicaid, or managed-Medicaid as their primary payer source (Proser, 2005). With patients ranging in age from infants to elderly, these FQHCs become a central hub in communities where resources are limited and healthcare is often accessed through much costlier care providers. Many of the very same limitations that have been justification for enrollment in HBPC services for elderly and VA patients, such as inability to obtain transportation, or risk of injury with OBPC visits, are present in FQHC patients, often related to socioeconomic factors that are present not just in elderly patients, but young families as well. In order to get these families the access to patient-centered primary care that they need, we must evaluate if HBPC is an effective model in removing barriers to care and whether it can be cost-effective in this population which differs from traditional HBPC patients.

With the passage of the Patient Protection and Affordable Care Act (PPACA), there has been an increase in the number of patients that have access to a payer source for their healthcare needs, but the largest area for this growth has been in the expansion of Medicaid (Rice, 2015). These patients may have coverage, but without a quality primary care provider (PCP) that accepts their new coverage, the patients remain medically underserved and prone to poor utilization of services for preventative screenings and chronic disease management. In many communities, the local FQHC is the largest provider of comprehensive primary care services to uninsured or Medicaid patients and

has consistently led the charge in bringing innovative approaches to delivering care and improving patient outcomes in a cost-effective manner (Hawkins & Groves, 2011). We see this in areas such as telemedicine, mobile medical and dental clinics, and the concept of patient-centered medical homes (PCMHs). There is significant bipartisan support for the FQHC program because it has shown to be a fiscally responsible investment of taxpayer funds and the return-on-investment is exceptional. With that in mind, there are always opportunities for further innovation and improvements in our approach to delivering primary care for this patient population. By implementing HBPC in a FQHC setting, we believe that this model will help to significantly remove barriers to primary care for patients.

Historically, Medicare and other payers have paid HBPC providers at a rate that is substantially higher than their OBPC colleagues, but the expectation is there is significantly more assessment and interaction that is required with these patients (Kao et al., 2009). FQHCs receive payment in a prospective payment system (PPS) that pays an encounter rate for a face-to-face encounter with an FQHC provider. This is different from a traditional private practice, where providers are paid in a fee-for-service model that is specific to the procedure or acuity level of the patient (Proser, 2005). Traditionally, the rate that FQHCs receive in the PPS system is significantly more than a fee-for-service Medicaid provider, but similar in amount to what Medicare pays for HBPC visits.

The study objective of this research was to determine if it is financially viable to proceed with wide-scale implementation of HBPC programs in FQHCs across the United States. With increased scrutiny being focused on quality metrics and reimbursement for value-based care instead of volume-based care, the case needed to be made as to whether

HBPC can be an economically-sustainable tool for delivery of primary care and population health management to medically underserved patient populations. The results of this study can give general guidance to policy makers to determine funding allocations and best practices for FQHCs and population health management strategies.

The research hypotheses were designed to evaluate whether there was evidence to support financial viability of implementing HBPC in FQHCs as well as the potential for improved clinical outcomes and the potential for additional value-based incentives for FQHCs.

Hypothesis H₁: Variations in FQHC rates of asthma control, adolescent weight screening, diabetes control, and childhood immunizations may be expected to affect the financial viability of implementation of HBPC programs in FQHCs across the U. S.

Hypothesis H₂: Current public FQHC reports can be used to predict the financial viability of implementing HBPC in specific locations.

Hypothesis H₃: Financial viability will differ within each FQHC for HBPCs aimed at asthma control, adolescent weight screening, diabetes control, and childhood immunization.

Materials and Methods

A retrospective cross sectional analysis of FQHC cost-per-patient data was conducted to analyze the financial sustainability of HBPC in FQHC settings. The primary aim of the study was to evaluate the economic feasibility of implementing HBPC in an FQHC. The cost of delivering care, clinical outcome measures, and other demographic measures such as race, ethnicity, age, sex, and payer source were all measured. Relationships between chronic disease conditions, cost-effectiveness, and demographic

characteristics were evaluated. All FQHC patient data from the Uniform Data System (UDS) for Ohio in the reporting year 2014 was used for this analysis. This data was accessed through the existing archival data available in the HRSA BPHC Data Warehouse. Upon receiving the data, a general overview showed that 5 of the original Ohio FQHCs had missing data for either financial measures or clinical measures and were then removed from this dataset. De-identified patient data was used, so this study was classified as non-human research by the Medical University of South Carolina (MUSC) Institutional Review Board (IRB).

This study population reflects the criteria that HRSA has set for being considered a FQHC patient (Hawkins & Groves, 2011). To be included in this empirical assessment, each FQHC in Ohio must have submitted UDS data for FY 2014 and have an adequate financial and clinical information. Exclusion criteria were applied to refine the study population. FQHCs that did not have any immunization, adolescent weight screening, asthmatic, or diabetic clinical data were removed from consideration. Data included all payer mixes and other demographic data. Figure 1 shows the study population with identification of inclusion and exclusion criteria.

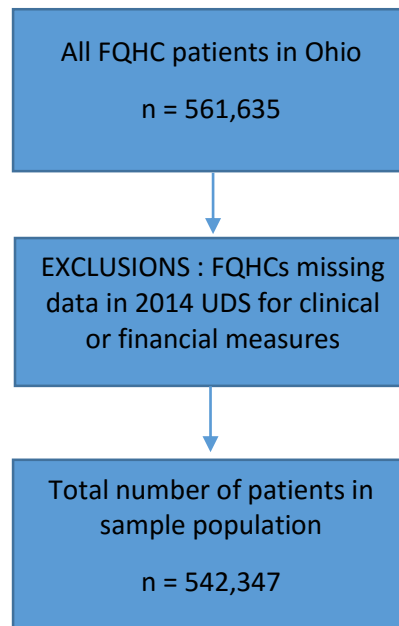


Figure 1. Inclusion and exclusion criteria for study population

Financial viability of implementing HBPC in FQHCs was the outcome on which this empirical assessment focused. Potential PPS encounter revenue was evaluated as well as potential quality incentive payments. Additionally, quality measures surrounding immunization rates, diabetic control, adolescent weight screening, and asthma control were variables in determining whether HBPC would be beneficial in helping patients and FQHCs improve on these measures and receive incentive payments from HRSA for quality improvement efforts. There are over 15 UDS clinical quality measures and for the purpose of this study we selected asthma control, immunization rates, diabetic control, and adolescent weight screening. These variables were selected due to their ability to be completed in a HBPC visit as well as their representative nature of FQHC patients. By selecting these four variables, we are able to analyze services for children, adolescents, and patients with multiple chronic diseases. Some of these measures, such as cervical

cancer screening, are unable to be completed in a HBPC visit, therefore were not evaluated for clinical improvement possibilities or financial viability.

The UDS classifications for measures of asthma control included: Asthma patients age 5 through 40 with at least one medical visit during the reporting period of January 1, 2014 and December 31, 2014, and at least two visits ever, with a diagnosis of mild, moderate or severe persistent asthma (UDS Manual, 2014). UDS measures for childhood immunization rates are considered: children with at least one medical visit during the reporting period from January 1, 2014 to December 31, 2014, who had their third birthday during the reporting period, and who were first seen ever by the health center prior to their third birthday (UDS Manual, 2014). Adolescent weight screening criteria looks at: children and adolescents aged 3 until 17 with at least one medical visit during the reporting period, who had their third birthday during or prior to the reporting period, and who were first seen ever by the health center prior to their 17th birthday.

The final clinical measure to be considered was diabetic control of FQHC patients in Ohio. This data point is developed by looking at: a proportion of adult patients born between January 1, 1940, and December 31, 1996, with a diagnosis of Type I or Type II diabetes, whose hemoglobin A1c (HbA1c) was less than or equal to 9% at the time of the last reading in the measurement year of January 1, 2014 to December 31, 2014. Health centers report results in three categories: less than 8%; greater than or equal to 8% and less than or equal to 9%; and greater than 9%. The measure itself, which is not dependent on which category of failure to meet the measurement standard a patient falls in, is calculated as follows: The number of adult patients whose most recent hemoglobin A1c level during the measurement year is $< 9\%$ among those patients included in the FY 2014

UDS Report submission from each FQHC divided by the number of adult patients aged 18 to 75, as of December 31, of the measurement year; with a diagnosis of Type I or II diabetes; and who have been seen in the clinic for medical visits at least twice during the reporting year (UDS Manual, 2014).

Archival data from the 2014 Ohio FQHC Report of the HRSA UDS Data Warehouse is available with financial, clinical, and operational data surrounding FQHCs across the United States. This data is publically available and is reported on an annual basis as a condition of healthcare organizations participating in the FQHC program. The 2014 Ohio FQHC Report from the HRSA UDS Data Warehouse includes: age and race / ethnicity information, FQHC patient characteristics, FQHC services provided, clinical data, and program cost data.

Clinical data measures include prevalence of hypertension, diabetes, asthma, HIV, access to prenatal care, cervical cancer screening, adolescent and adult weight screening, tobacco screening and cessation efforts, colorectal cancer screening, childhood immunization rates, depression screening, and appropriate treatment for asthma, hyperlipidemia, ischemic vascular disease, hypertension, diabetes, and HIV.

Results

Each respective clinical measure was reviewed to calculate the number of potential visits that may be generated and subsequent revenue. For each measure, a specific factor was used to project how many encounters would be anticipated. For childhood immunization rates, we used a factor of 1.5, for adolescent weight screening we used a factor of 1.0, for diabetic patients a factor of 4.0, and for asthma patients a factor of 3.0. This number was then multiplied by \$100 as a general average of the PPS

rate for FQHCs in Ohio. The rationale is that these encounters would otherwise not occur in an OBPC setting, so HBPC implementation would get patients the services they need and provide additional encounters for the FQHCs. This will not only improve quality outcomes for patients and communities, but help bring in critical revenue to the FQHCs. Overall, by implementing HBPC in these FQHCs, the potential revenue for FQHCs in Ohio would equal approximately \$72,000,000.

In addition, as healthcare reimbursement transitions to value-based reimbursement rather than volume-based reimbursement, there are opportunities for quality incentive payments for FQHCs. In order to properly assess the potential for these payments, we compared the award criteria from 2015 HRSA Quality Improvement Awards which were based on the same FY 2014 UDS Data to the compiled dataset. FQHCs have the opportunity to receive funding if they achieved the best overall clinical outcomes among all health centers, demonstrating a dedication to quality in all aspects of clinical operations.

- **Clinical quality improvers** received funding if they showed improvement in one or more clinical quality measures between 2013 and 2014, demonstrating a significant improvement to their patients' health.
- **Health center quality leaders** received funding if they achieved the best overall clinical outcomes among all health centers, demonstrating a dedication to quality in all aspects of clinical operations.
- **National quality leaders** received funding if they met or exceeded national clinical quality benchmarks, including Healthy People 2020 objectives, for chronic disease management, preventive care, and perinatal/prenatal care,

demonstrating health centers' critical role in improving quality health care nationwide (Health Center QI Awards, 2015).

For the sake of this assessment, if an FQHC had a clinical measure score that was at or above the national average we projected they would receive a clinical quality improver award, a health center quality leader award, and a national quality leader award. In 2015, the award for each of these designations were \$17,630, \$33,359, and \$40,293 respectively. For Ohio FQHCs who were already at or above the national average for each clinical measure, we projected they would collect \$91,282 which would be all three of the quality improvement awards. If a FQHC was within 10% of the national average, we made the assumption that with the HBPC program implementation, we would see at least a 10% increase in necessary services, so we gave those FQHCs the potential for \$50,989 or the first two quality improvement awards. If an FQHC was further than 10% under the national average, we did expect an improvement in these quality metrics but were unsure whether they would surpass their peers in the state or nationally, so we projected a quality incentive payment of \$17,630 for the quality improver award. In total, it is projected that in addition to reimbursement revenue for the encounters the included FQHCs in Ohio have the potential to see an additional approximately \$9,500,000 of revenue come into their centers by using HBPC as a tool in their population health management program. In total, with encounter revenue and potential quality improvement funds, there is a potential for the FQHCs in Ohio to see an increase in revenue of \$81,500,000.

Potential Encounter Revenue	Potential Quality Improvement Revenue	Total Potential Revenue
\$ 72,000,000	\$ 9,500,000	\$ 81,500,000

Table 1. Financial Viability Projections

Potential Encounters	Potential Patients Seen
720,000	335,000

Table 2. Additional patient and encounter projections

Discussion

The results of this study are promising for future opportunities for implementation of HBPC in FQHCs. Future collaborative efforts with hospitals, payers, and health policy makers could allow for additional uses of HBPC in FQHC populations outside of the clinical measures that we analyzed. While HBPC will not be appropriate for all FQHC patients, this assessment has produced data to suggest that it will be clinically beneficial and financial viable to implement HBPC in FQHCs. Additionally, this model will continue to help FQHCs remove barriers and help to meet the specific needs of the underserved populations they serve. Further discussion regarding recommended operationalization of HBPC in FQHCs is necessary as well as working with state legislatures in working to improve the ability for physicians, physician assistants, and nurse practitioners to provide these services to patients with minimal bureaucratic barriers. There are currently different models of HBPC, with some models relying on NPs and others using a mixture of physician and NPs / PAs. If a FQHC were to look at implementing a model that used only NPs / PAs, attention must be paid to each state's scope of practice laws for NPs / PAs and how this may determine the variation of HBPC model that a FQHC would choose to implement.

Additionally, this study only looked at the potential revenue for specific clinical measures and the encounters that would be attributed to the improvement of these measures. We did not evaluate the business expenses that would be necessary for implementing HBPC in FQHCs. Each FQHC would have to evaluate their needs and the

costs associated with implementing HBPC in their community. Analyzing the costs of physicians and non-physician providers, hiring of additional support staff, and equipment costs must be performed to fully determine individual feasibility of implementing HBPC in FQHCs. Finally, operational decisions such as the number of visits needed to maximize the efficacy of the HBPC programs would also need to be evaluated by each FQHC and tailored to the respective patient population.

Conclusion

When used strategically for addressing the needs of patients with chronic disease and those that are unable to access care and receive preventative services, FQHCs could use their interprofessional, patient-centered approach to care and implement HBPC to help further remove barriers for patients. This study has shown that not only is this an innovative approach to help in eliminating health disparities, but the way in which FQHCs are reimbursed allows for this to be a financially viable model that could be implemented on a large scale to help mobilize the population health management efforts that are currently being undertaken across the United States.

Future Studies

The findings of this study provide information from which further research is necessary to grow our understanding of HBPC implementation in FQHCs. As the U.S. health system continues to move towards population health management and value-based reimbursement, FQHCs are poised to play a central part in the reforms that will help us achieve the Triple Aim and begin to get more value for the amount we spend each year in healthcare expenditures.

REFERENCES

- Adams, E.K. & Johnson, V. (2000). An elementary school-based health clinic: Can it reduce Medicaid costs? *Pediatrics*, 105(4 Pt 1), 780-788.
- Agency for Healthcare Research and Quality: Effective Health Care Program (2014). *Home-based primary care interventions Systematic Review*. Retrieved from <http://www.effectivehealthcare.ahrq.gov>
- Auer, P., & Nirenberg, A. (2008). Nurse practitioner home-based primary care: A model for the care of frail elders. *Clinical Scholars Review*, 1(1), 33-39. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2010061045&site=ehost-live>
- Berry, J. G., Hall, M., Neff, J., Goodman, D., Cohen, E., Agrawal, R., Feudtner, C. (2014). Children with medical complexity and Medicaid: Spending and cost savings. *Health Affairs (Project Hope)*, 33(12), 2199-2206. doi:10.1377/hlthaff.2014.0828
- Blum, J. (2013). *Repealing the SGR and the path forward: A view from CMS*. Retrieved from <http://www.hhs.gov/asl/testify/2013/07/t2013710.html>
- Brown, C.M., Perkins, J., Blust, A., & Kahn, R.S. (2015). A neighborhood-based approach to population health in the pediatric medical home. *Journal of Community Health*, 40(1), 1-11. doi: 10.1007/s10900-014-9885-z.

- Campbell, J. D., Brooks, M., Hosokawa, P., Robinson, J., Song, L., & Krieger, J. (2015). Community health worker home visits for Medicaid-enrolled children with asthma: Effects on asthma outcomes and costs. *American Journal of Public Health, 105*(11), 2366-2372. doi:10.2105/AJPH.2015.302685
- Centers for Medicare and Medicaid Services (2015). *Affordable Care Act payment model saves more than \$25 million in first performance year*. Retrieved from <http://cms.gov/Newsroom/MediaReleaseDatabase/Press-releases/2015-Press-releases-items/2015-06-18.html>
- Colandrea, M., & Murphy-Gustavson, J. (2012). Patient care heart failure model: The hospitalization to home plan of care. *Home Healthcare Nurse, 30*(6), 337-344. doi:10.1097/NHH.0b013e3182575587
- Cooper, D. F., Granadillo, O. R., & Stacey, C. M. (2007). Home-based primary care: The care of the veteran at home. *Home Healthcare Nurse, 25*(5), 315-322. doi:10.1097/01.NHH.0000269965.16119.e5
- DeCherrie, L. V., Soriano, T., & Hayashi, J. (2012). Home-based primary care: A needed primary-care model for vulnerable populations. *Mount Sinai Journal of Medicine, 79*(4), 425-432. doi:10.1002/msj.21321
- Edes, T., & Burris, J. F. (2014). Home-based primary care: A VA innovation coming soon. *Physician Leadership Journal, 1*(1), 38-40, 42.

- Edes, T., Kinoshian, B., Vuckovic, N. H., Nichols, L. O., Becker, M. M., & Hossain, M. (2014). Better access, quality, and cost for clinically complex veterans with home-based primary care. *Journal of the American Geriatrics Society*, 62(10), 1954-1961. doi:10.1111/jgs.13030
- Eric De Jonge, K., Jamshed, N., Gilden, D., Kubisiak, J., Bruce, S. R., & Taler, G. (2014). Effects of home-based primary care on Medicare costs in high-risk elders. *Journal of the American Geriatrics Society*, 62(10), 1825-1831. doi:10.1111/jgs.12974
- Federman, A. D., & Soriano, T. (2014). More promise for home-based primary care. *JAMA Internal Medicine*, 174(11), 1804-1805.
- Foer, D., Ornstein, K., Soriano, T. A., Kathuria, N., & Dunn, A. (2012). Nonmedical factors associated with prolonged hospital length of stay in an urban homebound population. *Journal of Hospital Medicine*, 7(2), 73-78. doi:10.1002/jhm.992
- Gomes, B., Calanzani, N., Curiale, V., McCrone, P., & Higginson Irene, J. (2013). *Effectiveness and cost-effectiveness of home palliative care services for adults with advanced illness and their caregivers*. John Wiley & Sons, Ltd. doi:10.1002/14651858.CD007760.pub2
- Greene, S. B., Reiter, K. L., Kilpatrick, K. E., Leatherman, S., Somers, S. A., & Hamblin, A. (2008). Searching for a business case for quality in Medicaid managed care. *Health Care Management Review*, 33(4), 350-360. doi:10.1097/01.HCM.0000318772.59771.b2

- Hawkins, D., & Groves, D. (2011). The future role of community health centers in a changing health care landscape. *The Journal of Ambulatory Care Management*, 34(1), 90-99. doi:10.1097/JAC.0b013e3182047e87
- Health Center Quality Improvement FY 2015 Grant Awards (2015). Retrieved from <http://bphc.hrsa.gov/programopportunities/qualityimprovement/awards.aspx?state=OH#improvers>
- Hughes, S. L., Weaver, F. M., Giobbie-Hurder, A., Manheim, L., Henderson, W., Kubal, J. D. Department of Veterans Affairs Cooperative Study Group on Home-Based Primary Care. (2000). Effectiveness of team-managed home-based primary care: A randomized multicenter trial. *JAMA*, 284(22), 2877-2885. doi:joc00629
- Kao, H., Conant, R., Soriano, T., & McCormick, W. (2009). The past, present, and future of house calls. *Clinics in Geriatric Medicine*, 25(1), 19-34, doi:10.1016/j.cger.2008.10.005
- Keeton, V., Soleimanpour, S., & Brindis, C.D. (2012). School-based health centers in an era of health care reform: building on history. *Current Problems in Pediatric Adolescent Health Care*, 42(6), 132-158. doi: 10.1016/j.cppeds.2012.03.002.
- Klein, J.D., Handwerker, L., Sesselberg, T.S., Sutter, E., Flanagan, E., & Gawronski, B. (2007). Measuring quality of adolescent preventive services of health plan enrollees and school-based health center users. *Journal of Adolescent Health*, 41(2), 153-160.

- Lukas, L., Foltz, C., & Paxton, H. (2013). Hospital outcomes for a home-based palliative medicine consulting service. *Journal of Palliative Medicine*, 16(2), 179-184.
doi:10.1089/jpm.2012.0414
- Mortensen, K., & Song, P. H. (2008). Minding the gap: A decomposition of emergency department use by Medicaid enrollees and the uninsured. *Medical Care*, 46(10), 1099-1107. doi:10.1097/MLR.0b013e318185c92d
- NACHC Fact Sheet (2015). *Health centers provide cost effective care*. Retrieved from http://www.nachc.com/client/documents/Cost%20Effectiveness_FS_2015.pdf
- NACHC State Level Data (2016). *Ohio health center fact sheet*. Retrieved from <http://www.nachc.com/client/documents/research/maps/OH16.pdf>
- NACHC National Data (2016). *United States health center fact sheet*. Retrieved from <http://www.nachc.com/client//US16.pdf>
- Nelson, K., Sun, H., Dolan, E., Maynard, C., Beste, L., Bryson, C., Fihn, S. D. (2014). Elements of the patient-centered medical home associated with health outcomes among veterans: The role of primary care continuity, expanded access, and care coordination. *The Journal of Ambulatory Care Management*, 37(4), 331-338.
doi:10.1097/JAC.0000000000000032
- North, L., Kehm, L., Bent, K., & Hartman, T. (2008). Can home-based primary care: Cut costs? *The Nurse Practitioner*, 33(7), 39-44.
doi:10.1097/01.NPR.0000325980.52580.f3

- O'Leary, S.T., Lee, M., Federico, S., Barnard, J., Lockhart, S., Albright, K., Shmueli, D., Allison, M.A., & Kempe, A. (2014). School-based health centers as patient-centered medical homes. *Pediatrics*, *134*(5), 957-964. doi: 10.1542/peds.2014-0296.
- Ornstein, K., Hernandez, C. R., DeCherrie, L. V., & Soriano, T. A. (2011). The Mount Sinai (New York) visiting doctors program: Meeting the needs of the urban homebound population. *Care Management Journals: Journal of Case Management; the Journal of Long Term Home Health Care*, *12*(4), 159-163.
- Ornstein, K., Wajnberg, A., Kaye-Kauderer, H., Winkel, G., DeCherrie, L., Zhang, M., & Soriano, T. (2013). Reduction in symptoms for homebound patients receiving home-based primary and palliative care. *Journal of Palliative Medicine*, *16*(9), 1048-1054. doi:10.1089/jpm.2012.0546
- Ornstein, K. A., Leff, B., Covinsky, K. E., Ritchie, C. S., Federman, A. D., Roberts, L., Szanton, S. L. (2015). Epidemiology of the homebound population in the United States. *JAMA Internal Medicine*, *175*(7), 1180-1186. doi:10.1001/jamainternmed.2015.1849
- Parasuraman, S.R., & Shi, L. (2015). Differences in access to care among students using school-based health centers. *Journal of School Nursing*, *31*(4), 291-299. doi: 10.1177/1059840514556180.
- Patton, S. (2010). *How hospitals and federally qualified health centers should collaborate*. Retrieved from <http://www.healthleadersmedia.com/print/LED-249684/How-Hospitals-and-Federally-Qualified-Health-Centers-Should-Collaborate>

- Pedowitz, E. J., Ornstein, K. A., Farber, J., & DeCherrie, L. V. (2014). Time providing care outside visits in a home-based primary care program. *Journal of the American Geriatrics Society*, 62(6), 1122-1126. doi:10.1111/jgs.12828
- Pedowitz, E. J., Ornstein, K. A., Farber, J., & DeCherrie, L. V. (2014). Time providing care outside visits in a home-based primary care program. *Journal of the American Geriatrics Society*, 62(6), 1122-1126. doi:10.1111/jgs.12828
- Proser, M. (2005). Deserving the spotlight: Health centers provide high-quality and cost-effective care. *The Journal of Ambulatory Care Management*, 28(4), 321-330. doi:00004479-200510000-00007
- Pyne, J. M., Fortney, J. C., Mouden, S., Lu, L., Hudson, T. J., & Mittal, D. (2015). Cost-effectiveness of on-site versus off-site collaborative care for depression in rural FQHCs. *Psychiatric Services (Washington, D.C.)*, 66(5), 491-499. doi:10.1176/appi.ps.201400186
- Reckrey, J. M., Soriano, T. A., Hernandez, C. R., DeCherrie, L. V., Chavez, S., Zhang, M., & Ornstein, K. (2015). The team approach to home-based primary care: Restructuring care to meet individual, program, and system needs. *Journal of the American Geriatrics Society*, 63(2), 358-364. doi:10.1111/jgs.13196
- Rice, J. (2015). The need for increased home-based primary care visits. *Home Healthcare Now*, 33(9), 511. doi:10.1097/NHH.0000000000000293

Row, C. F., Braveman, C., Fasten, W., Alston, K., & Yudin, J. (2006). Medical house calls + home health agency collaboration: Quality of care and pay for performance strategies that work. *Caring: National Association for Home Care Magazine*, 25(6), 6-8, 10-11.

Schwartz, R.H. & Patton, S.H. (2013). *FQHCs and health reform: Five things private practice physicians absolutely need to know*. Retrieved from http://www.americanbar.org/publications/aba_health_esource/2013-14/november/fqhcs_ppaca.html

Shah, R. U., Tsai, V., Klein, L., & Heidenreich, P. A. (2011). Characteristics and outcomes of very elderly patients after first hospitalization for heart failure. *Circulation. Heart Failure*, 4(3), 301-307.
doi:10.1161/CIRCHEARTFAILURE.110.959114

Shea, D. (2007). Use of the electronic record in the home-based primary care programs of the department of Veterans Affairs health care system. *Home Healthcare Nurse*, 25(5), 323-326. doi:10.1097/01.NHH.0000269966.23743.83

Smith, K. L., Ornstein, K., Soriano, T., Muller, D., & Boal, J. (2006). A multidisciplinary program for delivering primary care to the underserved urban homebound: Looking back, moving forward. *Journal of the American Geriatrics Society*, 54(8), 1283-1289.

- Smith, K. L., Ornstein, K., Soriano, T., Muller, D., & Boal, J. (2006). A multidisciplinary program for delivering primary care to the underserved urban homebound: Looking back, moving forward. *Journal of the American Geriatrics Society*, 54(8), 1283-1289. doi:JGS835
- Smith-Carrier, T., & Neysmith, S. (2014). Analyzing the interprofessional working of a home-based primary care team. *Canadian Journal on Aging: La Revue Canadienne Du Vieillissement*, 33(3), 271-284. doi:10.1017/S071498081400021X
- Sommer, S. J., Queenin, L. M., Nethersole, S., Greenberg, J., Bhaumik, U., Stillman, L., Woods, E. R. (2011). Children's hospital Boston community asthma initiative: Partnerships and outcomes advance policy change. *Progress in Community Health Partnerships: Research, Education, and Action*, 5(3), 327-335. doi:10.1353/cpr.2011.0044
- Tung, T. K., Kaufmann, J. A., & Tanner, E. (2012). The effect of nurse practitioner practice in home care on emergency department visits for homebound older adult patients: An exploratory pilot study. *Home Healthcare Nurse*, 30(6), 366-372. doi:10.1097/NHH.0b013e318246dd53
- Uniform Data System Manual (2014). *UDS reporting instructions for health centers*. Retrieved from <http://bphc.hrsa.gov/datareporting/reporting/2014udsmanual.pdf>

- Wader, T.J. & Guo, J.J. (2010). Linking improvements in health-related quality of life to reductions in Medicaid costs among students who use school-based health centers. *American Journal of Public Health, 100*(9), 1611-1616. doi: 10.2105/AJPH.2009.185355.
- Wajnberg, A., Wang, K. H., Aniff, M., & Kunins, H. V. (2010). Hospitalizations and skilled nursing facility admissions before and after the implementation of a home-based primary care program. *Journal of the American Geriatrics Society, 58*(6), 1144-1147. doi:10.1111/j.1532-5415.2010.02859.x
- Weatherly, H., Drummond, M., Claxton, K., Cookson, R., Ferguson, B., Godfrey, C., Sowden, A. (2009). Methods for assessing the cost-effectiveness of public health interventions: Key challenges and recommendations. *Health Policy, 93*(2–3), 85-92. doi:<http://dx.doi.org/10.1016/j.healthpol.2009.07.012>
- Wharton, T.C., Nnodim, J., Hogikyan, R., Mody, L., James, M., Montagnini, M., & Fries, B.E. (2013). Assessing health status differences between Veterans Affairs home-based primary care and state Medicaid waiver program clients. *Journal of the American Medical Directors Association, 14*(4), 260-264. doi:10.1016/j.jamda.2012.10.015
- Zaldivar, A., & Bohnarczyk, N. (2013). New approaches to delivering primary and preventive care to the older population. *Home Healthcare Nurse, 31*(4), 219-225.

APPENDIX

FOR IMMEDIATE RELEASE

Tuesday, August 25, 2015

CONTACT: HRSA PRESS OFFICE
301-443-3376

HRSA announces \$63 million in Affordable Care Act funding to expand quality improvement systems in health centers

Health Resources and Services Administration (HRSA) Acting Administrator Jim Macrae today announced \$63.3 million in Affordable Care Act funding to 1,153 health centers in all 50 states, the District of Columbia, and 7 U.S. Territories to recognize health center achievements in providing high quality, comprehensive care. Health centers will use these funds to expand current quality improvement systems and infrastructure, and improve primary care service delivery in the communities they serve. “Today’s funding rewards those health centers that are achieving the highest levels of clinical quality performance and improvement,” said HRSA Acting Administrator Macrae. “The awards will help health centers continue to provide comprehensive primary care to the nation’s most vulnerable communities.”

Health centers receiving these funds are being recognized for high levels of performance in one or more of the following categories.

Quality Awards – Approximately \$43.7 million for 1,153 health centers.

- **Health center quality leaders** received funding if they achieved the best overall clinical outcomes among all health centers, demonstrating a dedication to quality in all aspects of clinical operations. 389 health centers received funding in this category for approximately \$13.8 million.
- **EHR reporters** received funding if they used Electronic Health Records (EHRs) to report clinical quality measure data for all patients, a foundation for quality improvement strategies. 491 health centers received funding in this category for approximately \$7.3 million.
- **Clinical quality improvers** received funding if they showed improvement in one or more clinical quality measures between 2013 and 2014, demonstrating a significant improvement to their patients’ health. 993 health centers received funding in this category for approximately \$19.7 million.

- **National quality leaders** received funding if they met or exceeded national clinical quality benchmarks, including Healthy People 2020 objectives, for chronic disease management, preventive care, and perinatal/prenatal care, demonstrating health centers' critical role in improving quality health care nationwide. 61 health centers received funding in this category for approximately \$2.9 million

Access Awards – Approximately \$9.7 million for 340 health centers.

- **Access enhancers** received awards for increasing the total number of patients served and the number of patients receiving comprehensive services between 2013 and 2014. 340 health centers received funding in this category for approximately \$9.7 million.

Value Awards – Approximately \$9.9 million for 139 health centers.

- **High value health centers** received funding for improving cost efficient care delivery compared to the national average while also increasing quality of care and improving access to comprehensive services. 139 health centers received funding in this category for approximately \$9.9 million.